FORM PTO-1390 (Modified) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE ATTORNEY'S DOCKET NUMBER
(REV 5-93)

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

017309/0172

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)
Unassigned 09/380739

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE98/00589	**February 28, 1998**	**March 11, 1997**

TITLE OF INVENTION
LAUNDRY DETERGENT COMPACT WHICH DISINTEGRATES IN LIQUID

APPLICANT(S) FOR DO/EO/US
Josef Otto RETTENMAIER; Hans-Friedrich KRUSE; Martin HOLL; Harald SCHLOSSER; and Armin UNGERER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.

3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).

4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)

6. ☒ A translation of the International Application into English (35 U.S.C. 371 (c)(2)).

7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.

8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).

10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.

12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

13. ☒ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.

14. ☐ A substitute specification.

15. ☐ A change of power of attorney and/or address letter.

16. ☒ Other items or information:

Amended sheets to specification, containing 2nd Replacement Sheets 1-16, including Verification of Translation; International Search Report

09/380739 510 Rec'd PCT/PTO 13 SEP 1999

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
Unassigned	PCT/DE98/00589	017309/0172

17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5):		
Search Report has been prepared by the EPO or JPO **$840.00**	**$840.00**	
International preliminary examination fee paid to USPTO (37 CFR 1.482) **$670.00**		
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2) **$760.00**		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$970.00**		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) **$96.00**		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 0.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e))	$ 0.00	

Claims	Number Filed	Number Extra	Rate		
Total Claims	15 -20 =	0	X $18.00	$ 0.00	
Independent Claims	1 -3 =	0	X $78.00	$ 0.00	
Multiple dependent claim(s) (if applicable)			+ $260.00	$ 0.00	
TOTAL OF ABOVE CALCULATIONS =				$ 840.00	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				$ 0.00	
SUBTOTAL =				$ 840.00	
Processing fee of **$130.00** for furnishing English translation later the ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f). +				$ 0.00	
TOTAL NATIONAL FEE =				$ 840.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +				$ 0.00	
TOTAL FEES ENCLOSED =				$ 840.0	
				Amount to be: refunded $	
				charged $	

a. ☒ A check in the amount of $840.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. 19-0741 in the amount of $ to the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 19-0741. A duplicate copy of this sheet is enclosed.

NOTE: **Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO:

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George E Quillin
SIGNATURE

George E. Quillin
NAME

32,792
REGISTRATION NUMBER

Form PTO-1390 (REV 5-93) (Modified)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No. 017309/0172

In re patent application of
RETTENMAIRER, et al.
Serial No.: Unassigned Group Art Unit: Unassigned
Filed: September 13, 1999 Examiner: Unassigned
For: LAUNDRY DETERGENT COMPACT WHICH DISINTEGRATES IN LIQUID

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application, Applicants respectfully request that the following amendments be entered into the application:

IN THE CLAIMS:

Claim 3, lines 1-2, delete "or 2".

Claim 5, lines 1-2, delete "one of Claims 1 to 4" and insert --Claim 2--.

Claim 6, lines 1-2, delete "one of Claims 1 to 5" and insert --Claim 1--.

Claim 8, lines 1-2, delete "one of Claims 1 to 7" and insert --Claim 1--.

Claim 9, lines 1-2, delete "one of Claims 1 to 8" and insert --Claim 1--.

Claim 11, lines 1-2, delete "one of Claims 1 to 10" and insert --Claim 1--.

Claim 12, lines 1-2, delete "one of Claims 1 to 11" and insert --Claim 1--.

Claim 13, lines 1-2, delete "one of Claims 1 to 12" and insert --Claim 1--.

Claim 14, lines 1-2, delete "one of Claims 1 to 13" and insert --Claim 1--.

Claim 15, lines 1-2, delete "one of Claims 1 to 14" and insert --Claim 1--.

REMARKS

Applicants respectfully request that the foregoing amendments to Claims 3, 5, 6, 8, 9, and 11-15 be entered in order to avoid this application incurring a surcharge for the presence of one or more multiple dependent claims.

Respectfully submitted,

September 13, 1999

George E. Quillin
Reg. No. 32,792

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TRANSLATION CERTIFICATION

This is to certify that the translation of the attached documents, **Reference: Patent Application: Compact Which Disintegrates In Liquid**, was performed by a professional translator, who is a native speaker of the target language and is to the best of our knowledge and ability, a true and accurate translation of the original text delivered to Language Innovations, LLC by our client **Foley & Lardner.** The original documents were translated from **German** into **English** and at completion delivered to the client on **September 13, 1999.**

I hereby declare that all statements made herein are of my own knowledge and are true and that all statements made based on information or belief are believed to be true. It is also understood that these statements are made with the knowledge that false statements are punishable by fine or imprisonment or both.

Language Innovations, LLC hereby agrees to keep the content of this translation confidential according to ethical and legal standards of the profession of Translation. Language Innovations, LLC agrees not to discuss, evaluate, distribute or reproduce any material included in or related to the translation of this document.

Date: September 13, 1999

Signature: _____

Brian S. Friedman, Managing Member
Language Innovations, LLC

Subscribed and sworn before me this 13th day of September 99, at Washington, DC.

_____
Notary Public

JAMES M. REED
Notary Public District of Columbia
My Commission Expires June 30, 2002

My Commission expires:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

I hereby certify that this correspondence is being hand delivered to the Commissioner of Patents and Trademarks, Washington, D.C. 20231 on this **24th** day of **July, 2001**, to the location of the file at the United States Patent and Trademark Office, PCT Legal, Crystal Plaza 2, 7th Floor, Room 07/D05, Arlington, Virginia.

James M. Olsen
Printed name of person mailing paper)

James M. Olsen
(Signature of person mailing paper)

In re Application of:

Josef Otto RETTENMAIER et al.

Serial No.: 09/380,739

Filed: December 15, 1999

For: LAUNDRY DETERGENT COMPACT WHICH DISINTEGRATES IN LIQUIDS

Group Art Unit: Unassigned

Examiner: Unassigned

Commissioner for Patents
Washington, D.C. 20231

Sir:

AMENDMENT UNDER 37 C.F.R. § 1.607

Prior to examination of the present application, please enter the following amendment.

IN THE CLAIMS:

Add new claims 16-27, as follows:

-- 16. A compacted tablet of cleaning composition, comprising a laundry detergent component and granules of a cellulose component, said granules having a particle size of from 200 μm to 6000 μm.

17. A tablet according to claim 16, wherein the granules of the cellulose component have a particle size of from 300 μm to 1500 μm.

18. A tablet according to claim 16, wherein the cellulose component is compacted prior to its admixture with the detergent component.

19. A tablet according to claim 19 wherein the mechanical wood pulp is thermo-mechanical derived wood pulp.

20. A tablet according to claim 19 wherein the mechanical wood pulp is chemo-thermo-mechanical derived wood pulp.

21. A tablet according to claim 16, wherein the cellulose component comprises 3 to 6 wt %, by weight of the tablet.

22. A tablet according to claim 16, wherein the cellulose component has a coating comprising a surfactant.

23. A tablet according to claim 24, wherein the surfactant coating comprises 0.5 to 5 wt %, by weight of the tablet.

24. A tablet according to claim 16, wherein the granules of the cellulose component are aggregates of cellulose particles having a particle size of 20 μm to 200 μm.

25. A tablet according to claim 26, wherein the granules of the cellulose component are aggregates of cellulose having a particle size of from 40 μm to 60 μm.

26. A process for making a tablet as claimed in claim 16 which comprises pressing a mixture of the detergent component with the cellulose component in a dry condition.

27. A process for making a tablet as claimed in claim 16 which comprises pressing a mixture of the detergent component with the cellulose component in a moist condition.—

REMARKS

New claims 16-27 are submitted under 37 C.F.R. § 1.607 in order to place the case in position to have an interference declared between the subject application and U.S. Patent No. 6,051,545 ("'545 patent"), and any pending continuation or divisional application thereof. A copy of the '545 patent is provided herewith as Exhibit 1, and was filed with the Information Disclosure Statement and Form PTO-1449 dated February 21, 2001.

Pursuant to 37 C.F.R. § 1.607(a)(2), Applicants present the following proposed count:

1. A detergent tablet selected from the group consisting of the tablets according to claim 1 or 2 or 16 or 17 or 26 or 27 of the present application (S.N. 09/380,739) and claim 1 or 2 or 4 of the '545 patent.

Applicants submit that claims 1-15 of the '545 patent correspond to the proposed count. Claims 16-27 of the instant application correspond to the proposed count. Newly added claims 16-27 are supported by the specification as follows:

Claim 16

A tablet of cleaning composition comprising a laundry detergent component and granules of a cellulose component,	Page 14, claim 1
said granules having a particle size of from 200 μm to 6000 μm.	Page 8, second paragraph

Claim 17

A tablet according to claim 16, wherein the granules of the cellulose component have a particle size of from 300 μm to 1500 μm.	Page 8, second paragraph.

Claim 18

A tablet according to claim 16, wherein the cellulose component is compacted prior to its admixture with the detergent component.	Page 5, first paragraph

Claim 19

A tablet according to claim 19 wherein the mechanical wood pulp is thermo-mechanical derived wood pulp.	Page 10, second and third full paragraphs

Claim 20

A tablet according to claim 19 wherein the mechanical wood pulp is chemo-thermo-mechanical derived wood pulp.	Page 10, second and third full paragraphs

Claim 21

A tablet according to claim 16, wherein the cellulose component comprises 3 to 6 wt %, by weight of the tablet.	Page 8, third paragraph

Claim 22

A tablet according to claim 16, wherein the cellulose component has a coating comprising a surfactant.	Page 9, third full paragraph

Claim 23

A tablet according to claim 24, wherein the surfactant coating comprises 0.5 to 5 wt %, by weight of the tablet.	Page 9, third full paragraph

Claim 24

A tablet according to claim 16, wherein the granules of the cellulose component are aggregates of cellulose particles having a particle size of 20 μm to 200 μm.	Paragraph bridging pages 5 and 6; page 14, claim 2

Claim 25

A tablet according to claim 26, wherein the granules of the cellulose component are aggregates of cellulose having a particle size of from 40 μm to 60 μm.	Paragraph bridging pages 5 and 6; page 8, first paragraph; page 14, claim 2

Claim 26

A process for making a tablet as claimed in claim 16 which comprises pressing a mixture of the detergent component with the cellulose component in a dry condition.	Paragraph bridging pages 9 and 10

Claim 27

A process for making a tablet as claimed in claim 16 which comprises pressing a mixture of the detergent component with the cellulose component in a moist condition.	Paragraph bridging pages 9 and 10

As indicated above, claims 16-27 find clear support in the present application. In addition, each corresponds to the proposed count, as do claims 1-15 and as does each claim of the '545 patent. Furthermore, claims 16-27 claim substantially the same subject matter as pending claims 1-15 and claims 1-20 of Applicants' priority application DE 197 09 991 A1 (being submitted herewith). Hence the requirements of 35 U.S.C. §135(b) are met by claims 16-27.

The following table identifies the correspondence between the claims.

Claims 16-27	Claims 1-15	Claims 1-20 of Priority Application
16	3	7
17	8	4
18	1	3
19	13	17
20	14	18
21	5	9
22	9	13
23	10	14
24	2	5
25	2	5
26	12	16
27	12	16

Under 37 C.F.R. § 1.607, a count should be broad enough to encompass all the claims designated to correspond to the count. As explained in the Gerhard Blasey Declaration provided herewith as Exhibit 2, the instant application and the '545 patent disclose and claim the same patentable invention, albeit in different terms.

(a) Applicants' disintegration agents' preferred particle size range of 300 to 1500 micrometers is substantially equivalent to an average particle dimension range of 500 to 1400 micrometers recited in claim 1 of the '545 patent (Blasey Declaration, paragraphs 12-14);

(b) The cellulose disintegration agents described in the instant application are substantially nonionic, water-insoluble, water swellable and polymeric, as recited in claim 1 of the '545 patent (Id., paragraphs 6-8, 11, 15);

(c) Disintegration agents described in the instant application are aggregates of smaller particles with a particle dimension not exceeding 200 micrometers in size, as recited in claims 2 and 4 of the '545 patent (Id., paragraph 16);

(d) Disintegration agents described in the instant application are polysaccharides, as recited in claim 3 of the '545 patent (id., paragraph 9); and

(e) Such polysaccharides are not only substantially nonionic, but nonionic to the degree that the charge density of such polymer does not exceed 10^{-3} (id., paragraph 15).

The effective filing date of the instant application, based on German priority patent application No. 197 09 991, is March 11, 1997, which is prior to the effective filing date of the '545 patent. Accordingly, Applicants request that an interference be declared between the instant application and the '545 patent and any continuing application thereof.

Applicants also wish to bring to the Examiner's attention the following applications of Lever Brothers Company, the assignee of the '545 patent, that disclose and claim subject matter related to the subject matter of the '545 patent:

(1) International Patent Application WO 98/55582, published December 10, 1998, which claims as priority European Patent application No. 97303924, filed June 6, 1999;

(2) International Patent Application WO 98/55590, published December 10, 1998, which claims as priority Great Britain patent application No. 9711829, filed June 6, 1997; and

(3) WO 98/55583, published December 10, 1998, which claims as priority GB 97 11831, filed June 6, 1997. The '545 patent issued from an application claiming as priority WO 98/55583.

Applicants have become aware of these applications after their publication. Applicants assume that U.S. counterpart applications may have been filed with claims the same as or similar to the International Applications, including another application based on International Application WO98/55583. The claimed subject matter of these applications (based on the claims of the International Applications) is not patentably distinct from the claimed subject matter of the instant application. Copies of International Patent Applications WO 98/55582 and WO 98/55590 are provided herewith (as Exhibits 3 and 4, respectively), and were filed with the Information Disclosure Statement and Form PTO-1449 dated February 21, 2001.

Applicants' assignee is also the owner of pending U.S. application S.N. 09/396,549 ("'549 application"), entitled "Household Detergent of Cleaning Action Shaped Bodies" filed September 3, 1999, which claims priority from German Patent Application No. 197 10 254, filed March 13, 1997. The '549 application has overlapping inventorship with the instant application. An investigation has determined that priority of invention and correct inventorship lies with the

instant application. Applicant's assignee will be filing an amendment in the '549 case to claim subject matter patentably distinct from the instant application and the '545 patent. The request for an interference with the '545 patent in the '549 case will be withdrawn.

If there are any other fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 03-2775. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

CONNOLLY BOVE LODGE & HUTZ LLP

Dated: July 24, 2001

By: James M. Olsen

James M. Olsen
Reg. No. 40,408

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. :

U.S. National Serial No. :

Filed :

PCT International Application No. : PCT/DE98/00589

VERIFICATION OF A TRANSLATION

I, the below named translator, hereby declare that:

My name and post office address are as stated below;

That I am knowledgeable in the German language in which the below identified international application was filed, and that, to the best of my knowledge and belief, the English translation of the international application No. PCT/DE98/00589 is a true and complete translation of the above identified international application as filed.

I hereby declare that all the statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent application issued thereon.

Date: 2 September 1999

Full name of the translator : Andrew Harvey David SUMPTER

For and on behalf of RWS Group plc

Post Office Address : Europa House, Marsham Way,
Gerrards Cross, Buckinghamshire,
England.

Laundry detergent compact which disintegrates in liquid

The invention relates to a laundry detergent compact of the type corresponding to the precharacterizing clause of Claim 1.

The provision of dishwasher detergents in the form of compacts of this kind is already conventional. To facilitate handling and dosing, these compacts are offered in the form of what are known as "tabs" (from "tablets"), having the size and form of chocolate candies and containing an amount of detergent sufficient for one wash in the dishwasher. Although the dishwasher detergent compacts act like small stones as a result of the compaction, they dissolve, without actually disintegrating, in hot flowing water, progressively from the outside to the inside, rapidly and completely, as a consequence of the dissolution of the ingredients in the water. This property of the dishwasher detergent compacts can be traced back to the composition of dishwasher detergents, which include no strongly differing components and, in particular, no insoluble components.

The problem of simple and reliable dosing arises not only with dishwasher detergents but also with other substances, and not only in the household but also in the industrial sector. Examples are, for example, dye compositions for the dyeing of textiles, other chemicals from which solutions of specific concentrations are to be prepared, and, in particular, detergents for textile

laundry, preferably in the domestic and industrial sectors, for example, clothes, bed and table linen, towels and the like. Detergents for these purposes have to date been marketed only in flowable or free-flowing form, i.e., as liquids and, predominantly, as powders or granules. This form of compounding requires the user to carry out portioning; in other words, it is necessary to place a specified amount of liquid or a specified amount of powder or granules into the washing machine. Serious errors are possible in this context if the user uses too much or too little detergent, whether mistakenly or intentionally. Furthermore, cases of soiling as a result of spills during the metering of the laundry detergent occur frequently.

The technique of providing compacts each containing a relatively large amount - for example, an amount sufficient for one wash - of the ingredients would also be of great significance for laundry detergents, since it would then be possible to limit metering to a counting procedure, without any need for weighing or volumetric operations. The laundry detergents, however, differ from the dishwasher detergents in that they are required to disperse much more rapidly in the washing liquid and are not intended to release their ingredients gradually. In addition, the laundry detergents include components which do not dissolve in water. As a consequence of the differences in the structure of the ingredients, portioning of laundry detergents in a manner comparable to that

to date for the dishwasher detergent tabs has come up against difficulties, since the balance between abrasion resistance and fracture strength of the compacts during transport and storage, on the one hand, and sufficiently rapid disintegration of the compacts in the wash liquid, on the other hand, has been difficult to find and maintain.

Previous attempts to create practicable laundry detergent compacts are described in EP 466 484 A2, US-A 5,382,377 and Derwent Ref.: 93-340 000/43. In the case of this prior art, on which the precharacterizing clause is based, attempts are made to bring about sufficiently rapid disintegration of the compacts in the wash liquid by means of an admixed and cocompacted disintegrant, for which cellulose is used in the three examples. The nature of the cellulose is described in more detail only in US-A-5,382,377: there it is specified as microcrystalline cellulose, which indeed is known as a tablet disintegrant from the pharmaceutical sector as well.

It has been found, however, that the addition of pulverulent or finely particulate cellulose as a disintegrant to laundry detergent compacts is inadequate in its effect and is unable to ensure that the compacts disintegrate with sufficient rapidity in the wash liquid.

The object on which the invention is based is to design a laundry detergent compact of the generic type in such a way that following introduction into the liquid it

rapidly disintegrates and releases the laundry detergent composition so that it can be dispersed in the liquid.

This object is achieved by means of the invention recited in Claim 1.

The laundry detergent compact is configured such that one compact or a number of compacts comprise(s) the amount of laundry detergent composition required for one load. The portioning takes place through the addition of one or more of these compacts, i.e., simply, by counting, rather than as hitherto by measuring out a specified quantity of a liquid or free-flowing composition. The laundry detergent compact must be of such a nature that it withstands handling on transport, storage and metering without instances of fragmentation and without substantial abrasion and yet breaks up with sufficient rapidity in water. For this purpose, the disintegrant is provided in the form of the compacted and granulated, finely particulate cellulose material which in the case of a medical tablet ensures that, on contact with the liquid, especially water, as a result of an increase in volume of the finely particulate particles within the mixture of the ingredients and the disintegrant, cracks occur in the laundry detergent compact through which the water penetrates rapidly into the interior of the laundry detergent compact and induces its disintegration.

The particular configuration of the disintegrant present in the laundry detergent compact is therefore of particular significance.

AMENDED PAGE

A very important aspect of the invention consists, to this extent, in that the finely particulate cellulose material is compacted prior to its admixture to the pulverulent laundry detergent.

The expression "compacting" in this case is intended to denote the exertion of a pressure on the cellulose material which compresses the volume of the cellulose material without destroying the fibers. In the case of compacting, therefore, the particles should have been deformed, in contrast to aggregation, where there is only accumulation of the particles without any substantial change in their form. Compacting in this sense is to be carried out prior to the admixture of the disintegrant so produced to the ingredients. When the laundry detergent compact comes into contact with water or the other liquid, the cellulose material springs back from its compacted state into a state with an open, relaxed volume. The question of whether this process is based on capillary or other forces can be disregarded. In any case, the enlargement in volume is substantially greater in degree than that which comes about in the case of simple swelling of the cellulose material.

Just as important is the provision of the cellulose material in granule form.

During or after compacting, therefore, granules are produced from the very finely divided - for example - ground - starting material, said granules constituting relatively large aggregates of a large number of initial

particles. These relatively large aggregates, i.e., the granules, are admixed to the ingredients and the mixture is compacted to form the laundry detergent compacts.

The purpose of these measures is to cause the individual ultrafine initial particles of the cellulose material to undergo, in contact with the liquid, the same relative increase in volume as a relatively large aggregate but with the absolute increase in volume of an ultrafine initial particle being too low to bring about local expansion enough to cause cracking in the material of the laundry detergent compact. The individual amounts add up in the granules to result in a macroscopic local expansion with a sufficient exploding effect.

In the case of the laundry detergents it is therefore possible to produce ready-to-use compacts which disintegrate in water within the periods of time under consideration.

An important dimension is the density of the compacted cellulose material, since it represents a measure of the appropriate compression of the material at which the right compromise is present between the strength adequate for handleability of the laundry detergent compact and its sufficient propensity to disintegrate.

In order to achieve the required rapid breakup with laundry detergents that have undergone necessary pressing to form a compact of sufficient strength, the need was not only for a particularly effective

disintegrant but also for one which has as little impact as possible both chemically during the washing operation and also subsequently, after the wash, on the laundry. Both requirements are ensured by the use of the cellulose material, especially in compact form, as disintegrant. The cellulose material is virtually inert in washing solutions and virtually absent from the laundry.

The liquid is water in the majority of cases, although the invention is not restricted thereto. Instead, it can also be used with other liquids, for example, alcohol or the like.

The "cellulose materials" to be used as disintegrants in accordance with the invention should be those in which the cellulose is still present at least predominantly in chemically unaltered form.

In another field, namely that of pharmaceuticals, the concept of adding a cellulose, employed as a disintegrant for pharmaceutical tablets, by compacting and subsequent granulation into relatively large aggregates, is known per se by virtue of US-A-4,269,859.

From US-A 3,951,821 it can be inferred that tubular particles of cellulose material are incorporated into the tablets in order to promote the rapid disintegration of a tablet on contact with a liquid. The increase in the disintegration rate on contact with a liquid is based on the capillary effect, i.e., the liquid is conveyed rapidly into the interior of the tablet, thereby initiating the disintegration thereof.

A particle size of the starting material, which is in the form of relatively large granules following compaction, of 40-60 μm has proven judicious for laundry detergents (Claim 2). Such fine cellulose starting materials can be produced at a comminution expense which is still acceptable, and are virtually absent from the laundry.

According to Claim 3, the compacted particles of the cellulose material, i.e., the granules, can have a particle size of from 0.2 to 6.0 mm, in particular from 0.3 to 1.5 mm (Claim 4), the most judicious particle size depending inter alia on the size of the laundry detergent compact and, indirectly, on the nature of the ingredients of the detergent compact, insofar as, for example, different laundry detergents have different compositions with different pressing and disintegration properties.

According to Claim 5, the weight fraction of the compacted cellulose material in the finished detergent compact can be from 3 to 6 percent.

It may also be advisable for the detergent compact to comprise, additionally, a fraction of finely divided noncompacted cellulose material (Claim 6).

This fraction, although it does not act as a disintegrant, may, however, develop a kind of wicking action in the pressed mass and may be useful for the more rapid penetrative progress of the water into the interior of the detergent compact.

The weight fraction of the uncompacted cellulose

material in the finished detergent compact can be from 1 to 3 percent (Claim 7).

The compacted cellulose material present in the detergent compact can have a coating comprising a swelling agent and/or thickener (Claim 8).

Substances of this kind are known per se as tablet disintegrants in the pharmaceutical field (see "Römpp-Chemie-Lexikon" 9th edition (1995), page 4440, entry "Tablettensprengmittel" [*Tablet disintegrants*]).

Furthermore, it may be advisable for the cellulose material present in the detergent compact to have a coating comprising a surfactant (Claim 9), which can make up a weight fraction of from 0.5 to 5.0 percent of the finished detergent compact (Claim 10) and which is present in the detergent compact in addition to the surfactant already present in the pulverulent laundry detergent. The surfactant is intended to promote the distribution of the liquid along the surface of the particles of the cellulose material.

The dispersion properties of the cellulose material can be increased if it is at least partly fibrillated, i.e., is comminuted down to the level of bundles each comprising a few cellulose fibers lying parallel to one another (Claim 11).

In order to achieve sufficient dispersibility, i.e., instant disintegration of the detergent compact following introduction into the liquid, it is advisable to press it from a mixture of the pulverulent or granular

ingredients with the finely divided cellulose material in dry or earth-moist form (Claim 12).

The detergent compacts should therefore cohere only through the pressing which has taken place, and not by way of liquid components which subsequently harden and which would retard the disintegration of the detergent compact in the liquid or in the water.

In the course of the development work, two kinds of cellulose material were found particularly suitable, namely TMP (= thermo-mechanical pulp) (Claim 13) and CTMP (= chemo-thermo-mechanical pulp) (Claim 14).

These are two kinds of so-called mechanical woodpulp. In the case of the TMP process, wood chips are defibered under vapor pressure at about 130°C in pressure refiners to form TMP. When chemicals are used in the initial steaming of the wood chips, the result is CTMP (see "Römpp-Chemie-Lexikon" 9th edition (1995), page 3207, entry "Papier" [*Paper*]).

In the case of the mechanical woodpulps TMP and CTMP, although a certain leaching of the material has taken place, the lignins, resins and other wood constituents have not been removed completely, in particular not as completely as in the case of cellulose production. These mechanical woodpulps therefore constitute cellulose materials which have retained a residuum of the woody character.

The two abovementioned materials have been found particularly effective as disintegrants for the compact

in question, especially in the compacted state. Neither pure wood products such as wood flour or wood fibers, nor pure cellulose, are comparable in their disintegration behavior. In the case of the "moderately treated" products TMP and CTMP there exists a distinct maximum of effect.

The relevant dimensions of the laundry detergent compact are characterized by a largest dimension of from about 1 to 10 cm, preferably from 2 to 4 cm (Claim 15).

The drawing shows an exemplary embodiment of the invention in diagrammatic form.

Fig. 1 shows one possible type of compacting of cellulose material;

Fig. 2 shows a compacted granule;

Fig. 3 shows a laundry detergent compact.

In accordance with Fig. 1, a bed 1 of cellulose material, TMP in the exemplary embodiment, is passed to a pair 2 of press rolls in which compacting takes place with compression of the volume of the individual particles and joining thereof to form a kind of coherent, densified web 3. 4 symbolizes the comminution of the web 3 to granules 5.

A single granule 5 is shown in Fig. 2. It contains a relatively large number of ultrafine TMP particles 6 whose particle size is about 50 μm, i.e., the TMP material has a particle size distribution whose maximum lies at about 50 μm. The individual ultrafine TMP particles 6 hold together by virtue of the pressing

action they have experienced between the pair 2 of press rolls. At the same time, the individual particles 6 have been compressed in the nip relative to their original form, i.e., they have undergone compaction.

The granules 5 in turn have a particle size distribution with a maximum at about 2 mm, i.e., the size of the granules 5 is about 2 orders of magnitude above the size of the ultrafine TMP particles they contain.

In accordance with Fig. 2, uncompacted cellulose particles 7 may also be present in the granules 5, said particles being indicated by short straight lines and possibly having a coating comprising a surfactant in order to promote the penetration of the liquid, especially the washwater.

The laundry detergent composition is present, in its turn, as a powder/granule mixture. The individual laundry detergent particles are designated as 8 in Fig. 3. The laundry detergent composition is mixed with the granules 5 of TMP, which are depicted as small circles in Fig. 3, and the mixture is then pressed to form a detergent compact 10 which in accordance with Fig. 3 is shaped as a small solid rectangle having edge lengths of from 2 to 3 cm. However, all other forms may be considered; for example, small round disks or the like.

The pressing of the laundry detergent compacts 10 takes place such that they do not crumple in the course of handling and yet when introduced into the liquid they disintegrate almost instantaneously and release the

detergent composition. This is brought about by virtue of the granules 5, which in contact with the washwater immediately recover their former shape, i.e., reverse the compacting, and so increase in volume. If the volume increase concerned amounts to 20 percent and the individual particles are, for example, 2 mm in size, contacting with the water produces an expansion of 0.4 mm, which is sufficient to bring about local disintegration of the bonding - induced only by virtue of the dry pressing - of the detergent compact 10, and release of the detergent particles. The granules 5 themselves also disintegrate on contact with the washwater, so that, ultimately, the latter contains only the individual particles 6 and 7 of the cellulose material, which are essentially inert chemically and which also do not cause any other disruption of the washing operation.

Patent Claims

1. Laundry detergent compact comprising a pulverulent and/granular [sic] laundry detergent composition and an incorporated disintegrant comprising finely divided cellulose material, which is intended for rapid dissolution/dispersion with release of the laundry detergent composition following introduction into liquid, **characterized in** that the cellulose material is compacted prior to its admixture to the laundry detergent composition and is present in the compact in the form of compacted granules having a density of from 0.5 to 1.5 g/cm^3.

2. Laundry detergent compact according to Claim 1, **characterized in** that in the case of a laundry detergent composition the particle size of the cellulose starting material is from 20 to 200 μm, preferably from 40 μm to 60 μm.

3. Laundry detergent compact according to Claim 1 or 2, **characterized in** that in the compacted granules of the cellulose material have a particle size of from 0.2 to 6.0 mm.

4. Laundry detergent compact according to Claim 3, **characterized in** that in the compacted granules of the cellulose material have a particle size of from 0.4 to 1.5 mm.

5. Laundry detergent compact according to one of Claims 1 to 4, **characterized in** that the weight fraction

of the compacted cellulose material in the finished compact is from 3 to 6 percent.

6. Laundry detergent compact according to one of Claims 1 to 5, **characterized in** that it additionally includes a fraction of finely divided noncompacted cellulose material.

7. Laundry detergent compact according to Claim 6, **characterized in** that the weight fraction of the non-compacted cellulose material in the finished compact is from 1 to 3 percent.

8. Laundry detergent compact according to one of Claims 1 to 7, **characterized in** that the cellulose material present in the compact has a coating comprising a swelling agent and/or thickener.

9. Laundry detergent compact according to one of Claims 1 to 8, **characterized in** that the cellulose material present in the compact has a coating comprising a surfactant.

10. Laundry detergent compact according to Claim 9, **characterized in** that the compact comprises the surfactant in a weight fraction of from 0.5 to 2.0 percent of the finished compact.

11. Laundry detergent compact according to one of Claims 1 to 10, **characterized in** that the compact comprises fibrillated cellulose material.

12. Laundry detergent compact according to one of Claims 1 to 11, **characterized in** that the compact has been pressed from a mixture of the pulverulent or

granular ingredients with the finely divided cellulose material in dry or earth-moist from.

13. Laundry detergent compact according to one of Claims 1 to 12, **characterized in** that the cellulose material is TMP (thermo-mechanical pulp).

14. Laundry detergent compact according to one of Claims 1 to 13, **characterized in** that the cellulose material is CTMP (chemo-thermo-mechanical pulp).

15. Laundry detergent compact according to one of Claims 1 to 14, **characterized in** that the largest dimension of the compact is from 1 to 10 cm, preferably from 2 to 4 cm.

FIG.1

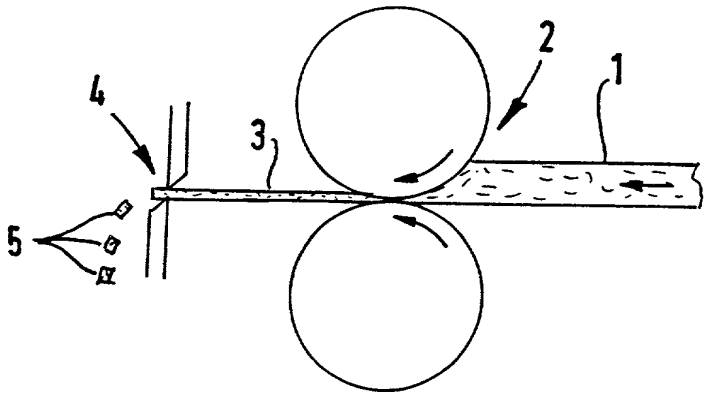


FIG.2

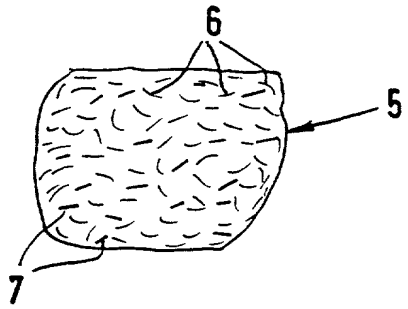
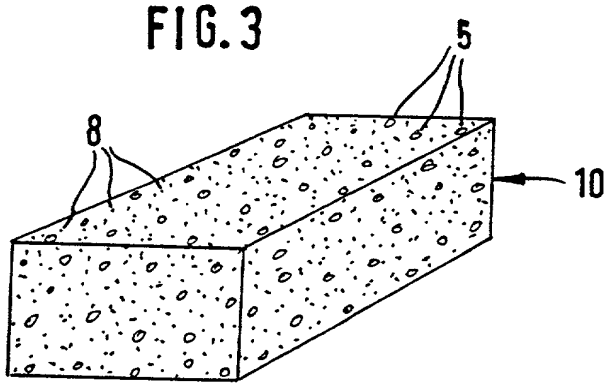


FIG.3



Docket No. 017309/0172

DECLARATION AND POWER OF ATTORNEY

[redacted]below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

LAUNDRY DETERGENT COMPACT WHICH DISINTEGRATES IN LIQUID

the specification of which is attached hereto unless the following box is checked:

☒ was filed on ***February 28, 1998*** as United States Application Number or PCT International Application Number ***PCT/DE98/00589*** and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is known by me to be material to patentability as defined in Title 37, Code of Federal Regulations § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

PRIOR FOREIGN APPLICATION(S)

NUMBER	COUNTRY	DAY/MONTH/YEAR FILED	PRIORITY CLAIMED
197 09 991.2	*Federal Republic of Germany*	*11 March 1997*	*Yes*

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

APPLICATION NO.	FILING DATE

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is known by me to be material to patentability as defined in Title 37, Code of Federal Regulations § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

APPLICATION SERIAL NO.	FILING DATE	STATUS: PATENTED, PENDING, ABANDONED

I hereby appoint as my attorneys, with full powers of substitution and revocation, to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: Stephen A. Bent, Reg. No. 29,768; David A. Blumenthal, Reg. No. 26,257; Alan I. Cantor, Reg. No. 28,163; William T. Ellis, Reg. No. 26,874; John J. Feldhaus, Reg. No. 28,822; Patricia D. Granados, Reg. No. 33,683; John P. Isacson, Reg. No. 33,715; Michael D. Kaminski, Reg. No. 32,904; Kenneth E. Krosin, Reg. No. 25,735; Glenn Law, Reg No. 34,371; Eugene M. Lee, Reg. No. 32,039; Richard Linn, Reg. No. 25,144; Peter G. Mack, Reg. No. 26,001; Brian J. McNamara, Reg. No. 32,789; Sybil Meloy, Reg. No. 22,749; Richard C. Peet, Reg. No. 35,792; George E. Quillin, Reg. No. 32,792; Colin G. Sandercock, Reg. No. 31,298; Bernhard D. Saxe, Reg. No. 28,665; Charles F. Schill, Reg. No. 27,590; Richard L. Schwaab, Reg. No. 25,479; Arthur Schwartz, Reg. No. 22,115; Harold C. Wegner, Reg. No. 25,258.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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